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ABSTRACT

Examining 1,815 Pennsylvania rural boroughs and townships, seven variables were employed to determine the places where net migration had been outward 1940-60 and inward 1960-70 and where it had been inward 1960-70 and outward 1960-70. The demographic variables employed were: (1) total population of each selected nonmetropolitan area, (2) absolute changes in the size of the college or military population, (3) percentage of residents 15-24 years old, and (4) population per square mile. The ecological variables employed were: (1) highway accessibility, (2) functional differentiation in industry types, and (3) population potential. Local officials were surveyed via mail to determine if they agreed with the turnaround migration hypothesis (55 percent response). Findings indicated that most nonmetropolitan minor civil divisions had experienced out-migration between 1940 and 1970, though 10 percent had experienced net in-migration, and nearly 18 percent were termed net migration turnaround areas (three times as many of these places turned around to net in-migration between 1960 and 1970 than places which turned around to net out-migration). It was also found that on the average both types of migration turnaround had occurred about 20-25 miles from an urban center; that reductions in farming, industry, and military installations were evident in places having out-migration turnaround; and that not in-migration turnaround; and that net in-migration turnaround areas had residents employed in relatively specialized industries. (JC)

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Net Migration Turnaround in Pennsylvania Nonmetropolitan Minor Civil Divisions

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Introduction

This research examines migration turnaround in nonmetropolitan places where net migration trends reversed between 1960 and 1970 for the first time since 1940. The investigators compare demographic and ecological characteristics of two kinds of communities: 1) places where net migration had been outward 1940-1960 and inward 1960-1970; 2) places where net migration had been inward 1940-1960 and outward 1960-1970. Unlike previous studies of this kind which have focused on the annual growth of places (Hansen, 1973; Beale, 1974) this research uses net migration reversal as the differentiating criterion. Natural increase has diminished in importance as a source of local variation in growth as the U.S. birth rate has become both low and relatively homogeneous, leaving net migration as the main source of local demographic change in the 1960's. A study which focused on nonmetropolitan Pennsylvania, for example, found the correlation between net migration and growth equaled .80 between 1960 and 1970 (Zelinsky, et. al., 1974). In agreement with a study in Iowa (Chang, 1974), we suspect that in general net migration has been central to changes in the demographic growth of nonmetropolitan areas.

At least two phenomena account for interest in population turnaround among scholars as well as policy makers. First, the rate of nonmetropolitan population growth has exceeded metropolitan population growth for the past several years (Beale, 1972, 1974). Second, population density with its ensuing benefits and disbenefits has fostered the study of population redistribution (Sunquist, 1970). Since it is likely that migration turnaround has played a key role in the increased rate of nonmetropolitan growth, and since migration implies population redistribution by definition, this research provides needed information about particularly relevant nonmetrooolitan places and population trends.

Survey of the Literature

It is common knowledge that rural areas, small towns, and cities outside the boundaries of metropolitan communities have not been the usual place of residence for the majority of people in industrial countries for many years. According to the U.S. Census of Population taken in 1970, 68.6% of Americans lived in metropolitan areas, and the majority of these people resided in the suburbs (Hawley, 1971; I. B. Taeuber, 1972). This pattern of population distribution has been a major departure from the settlement pattern in the U.S. before the civil war when most people lived on farms or in small towns.

However, contrary to popular opinion, the migration of people into metropolitan areas has not caused many small towns to "die" (Brunner, 1936; Brunner and Smith, 1944; Marshall, 1946; Ratcliff and Ratcliff, 1942). Between 1940 and 1950 the ratio of incorporated places with 1000-2500 residents growing, to towns in the same size range losing people, equaled 1.6 (Brunner, 1952). Over the period 1940-1970, the number of incorporated places increased from 12,825 to 13,819. The population of these places increased from 22,660,000 to 33,252,000 (Fuguitt, 1972).

If the nonmetropolitan sector is subdivided into farm and nonfarm areas, one sees that the rural nonfarm population grew 19.3% between 1960 and 1970. This growth is faster than the total U.S. population (13.3%) or the metropolitan U.S. (16.6%) during the same time interval (Beale, 1972). The fastest growing nonmetropolitan places had colleges or military installations, were located closer to controlled access highway interchanges and metropolitan communities, were places with more than one economic specialty, and/or had low population density, though many other nonmetropolitan areas have been growing as well (Zuiches, 1970; Tarver and Beale, 1968; Tarver, 1972; Humphrey and Sell, 1975).

Several nonmetropolitan areas have experienced population turnaround since 1960, either shifting from population decline to growth or to an acceleration of existing growth. Regional examples of this nonmetropolitan

phenomenon include northern Vermont and New Hampshire, the Ozark mountains, the northern part of Minnesota and Wisconsin, the Tennessee Valley, parts of Colorado and New Mexico, northern Georgia, and central Texas. Though the economic and social forces behing this turnaround have been complex, two generalizations explaining these trends have been validated. As manufacturing processes become more routine and automated, skill requirements decrease. For old manufactures to remain competitive, therefore, they move to smaller places where less skilled workers are available and where wage demands are less than in bigger cities (Thompson, 1969). Turnaround also represents an "extension of the urban field." People are traveling to urban areas for work from more distant places, and metropolitan residents are using nonmetropolitan places for vacations, second homes, and retirement (Hansen, 1973).

No studies have been published about boroughs and townships where net migration reversed itself between 1960 and 1970. We thought it would be especially fruitful to examine turnaround in a single region of the United States, since regions differ in their redistribution trends (Fuguitt, 1972). Further, for the population of a county (a common unit of analysis) to reverse its pattern of growth, subunits within that county first must do so. Many counties have turnaround areas within them which have not been analyzed in past research, because they have been aggregated with other nonmetropolitan places where trends have not turned around. By disaggregating nonmetropolitan areas to the minor civil division level, this research was able to analyze more population turnaround in one region than would have been possible with more conventional units of analysis. Although the small size of these places has made errors in enumeration or in estimating net migration potentially significant, we feel that the advantages in using this disaggregated unit of analysis outweigh the potential disadvantages.

Research Methods

One thousand eight hundred and fifteen boroughs and townships in nonmetropolitan Pennsylvania serve as the areal units in this research.[1]

Where boundary changes caused by annexation, incorporation, or disincorporation had occurred at any time between 1940 and 1970, contiguous minor civil divisions were combined. Ths procedure created a stable set of nonmetropolitan places where changes in population observed from one census to the next were the result of migration, natural increase, and variation in the accuracy of method of enumeration.

Migration as used in this research is the estimated intercensal net migration rate for residents of nonmetropolitan minor civil divisions 15 years old and older at the end of each decade.[2] Survival ratios were used to estimate intercensal net migration in the absence of available vital statistics for minor civil divisions before 1960 (Gillaspy, et. al., 1974). Census and lifetable survival ratios separately were applied to specific age-sex groups at the onset of an intercensal period to estimate "expected survivors" at the end of that decennial period. The differences between expected and observed numbers provided estimates for the number of net migrants. Reciprocals of the various survival ratios were also applied to age-sex groups observed at the end of each intercensal period, producing the "revived population" ten years earlier. By averaging the estimated numbers of net migrants obtained by working forward and backward as well as the numbers obtained with census and life table survival ratios, the mean estimated net migrants by age and sex were derived for each minor civil division(s) in the three intercensal periods.[3]

Four demographic variables were among the characteristics of turnaround areas measured in the study. The total population of each selected nonmetropolitan place was recorded. The absolute change in the size of the college or military population was used as another possible explanatory variable because both institutions have been important for nonmetropolitan population change (Irwin, 1971; Zuiches, 1970; Humphrey and Sell, 1974). The percentage of residents 15-24 years old was used because this age group has consistently been the most mobil. Communities with relatively large population in these ages may have more power to retain young people than other places (Lowry, 1966). The population per square mile was also computed because low density areas have more potential

for positive net migration turnaround in nonmetropolitan areas where high rise construction and vertical growth of communities has been uncommon.

Three ecological variables were measured inasmuch as they considered the location and spacial relations among the nonmetropolitan places. The change in distance measured in miles from the center of each minor civil division to the nearest controlled access highway interchange during each intercensal period served as a measure of highway accessibility. An index of functional differentiation was calculated by summing the number of industries by type employing more than one standard deviation above the average percentage of workers for the entire nonmetropolitan study area (Tarver, 1972).[4] This measure provided a means to examine the differences in economic bases for net in and net out migration turnaround areas. We also computed the population potential of each place by summing the population in a place multiplied by the population of each other place divided by distance in miles between places (Sell, 1974).[5]

Two procedures were used to examine the statistical importance of the seven independent variables in distinguishing between positive and negative net migration turnaround areas. A one-way analysis of variance was used to see if the statistical variation in a demographic or ecological characteristic was significantly greater between the two kinds of turnaround areas than within either group. The investigators also used discriminant function analysis (Hallberg, 1971) to calculate standardized discriminant coefficients which take into account the intercorrelations among the seven variables and maximally differentiate between the in and out migration turnaround places. Examination of these discriminant coefficients provide an indicator of the relative importance of explanatory variables in differentiating between the two groups of minor civil divisions.

Finally, the investigators conducted a survey among the local officials in boroughs and townships of nonmetropolitan Pennsylvania. A brief mail questionnaire was sent to mayors or township supervisors in each turnaround area. The local officals were asked if they agreed or disagreed with our estimate of what happened to migration in their community

since 1960, how they explained recent migration trends, how long they had resided in the community, and people's attitude toward growth of their locality. After two mailings of the questionnaire, 55% of the respondents had returned the requested information to us. There was no difference in the response rate between areas with net in or net out migration turnaround. The average length of residence in a turnaround area for these officials equaled 39 years.

Findings

Most nonmetropolitan minor civil divisions in this research had out-migration between 1940 and 1970, as is evident in Table 1.

(Insert Table 1 here)

Nearly one-half of the places consistently experienced out-migration in the thirty year period, and only about 10% of the nonmetropolitan places had net in-migration, 1940-1970. Nearly 18% of the nonmetropolitan places were classified as net migration turnaround areas. Three times as many (13.2%) of these places turned around to net in-migration between 1960 and 1970 than places which turned around to net out-migration (4.5%) during the same period of time. Thus, in a nonmetropolitan area where net out-migration is common and where net migration turnaround is not likely, net migration turnaround has been more likely to induce growth than population decline among these selected boroughs and townships.

(Insert Table 2 here)

The small numbers of migrants responsible for net migration turnaround were understandable within the context of the other characteristics of these nonmetropolitan minor civil divisions presented in Table 2. All together the boroughs and townships in this research averaged less than 2500 residents up to 1970, and then their average size was only about 2700 residents. These places on the average had small increases in their populations of college students or military personnel. They were also located in 1960 more than 20 miles from a controlled access highway interchange and about 26 miles from the nearest metropolitan areas. Between 1960 and 1970,

hen the turnaround observed in this study occurred, all these places experienced reductions in the distance to a controlled access highway, so that a typical highway interchange was about 8 miles away in 1972.

When the demographic and ecological characteristics of the net migration turnaround areas were compared to each other or to the entire nonmetropolitan population, rather sharp contrasts are sometimes apparent. The mean population of the net in-migration turnaround areas, for example, was smaller than either the net out-migration areas or the entire sample for each census since 1940. The net out-migration turnaround areas were always larger and increasingly so, on the average, than the entire set of nonmetropolitan areas. Net in-migration turnaround areas in contrast to net-outmigration turnaround areas had almost negligible college or military people in residence compared with out-migration turnaround places or the entire sample, and they had the lowest population density of the three groups. We also found that the locations of both kinds of turnaround areas were comparable. In 1960 the net in-migration turnaround areas averaged 23.9 miles from a controlled access highway interchange and 25.7 miles from a metropolitan community (SMSA). The net out-migration turnaround areas were 19.0 miles from a controlled access highway interchange and 23.3 miles from a SMSA. It is of interest to note that in turnaround areas were less accessible than out turnaround areas both with respect to highways and metropolitan populations.

Univariate comparisons of mean values always suffer from the problem that several of the descriptive characteristics may themselves be intercorrelated. For this reason a stepwise discriminant analysis procedure was utilized to arrive at a reduced set of variables which maximally differentiate between the two types of turnaround areas. The seven most important discriminating variables are presented in Table 3.

(Insert Table 3 here)

The population of the minor civil division in 1960 was the major characteristic distinguishing between the two types of nonmetropolitan turnaround places. The percentage of residents in the mobile ages, 15-24, also played a significant part in net migration turnaround. Turnaround

areas with larger proportions of residents 15-24 years at the onset of the decade tended to have net out-migration during the decade. The places turning to net out-migration between 1960 and 1970 also experienced greater reductions than many nonmetropolitan places in distance to a controlled access highway interchange in the 1940's and 1950's. Finally, the net in-migration turnaround areas had lower population density than out-migration turnaround areas at the onset of the decade. No statistically significant differences at the .10 level or less were found between the two groups of turnaround areas in terms of distance to the nearest metropolitan community, population potential, the college and/or military population, or the functional classification of the two kinds of nonmetropolitan places.

Certain characteristics of nonmetropolitan places were not included in the final discriminant function analysis because of intercorrelations with variables remaining in the final analysis. This was the case with the functional differentiation index for the minor civil divisions a variable correlated with demographic size. Because past research has emphasized the importance of economic specialization for growth (Tarver, 1972; Johansen and Fuguitt, 1973), the functional differentiation of the turnaround places is considered, even though this variable was not statistically significant in the multivariate context. Table 4 shows that places

(Insert Table 4 here)

with net in-migration turnaround had a larger proportion of the labor force employed in specialized economic organizations than the net out-migration turnaround areas. Agriculture, manufacturing nondurable goods such as food processing or textiles, and construction jobs were especially important sources of employment in net in-migration turnaround areas, 1960-1970. Employment patterns in net out-migration turnaround places was not statistically distinctive with these data.

The officals who completed questionnaires supplied additional insight into the possible causes of net migration turnaround, as evident in Table 5. The construction work in the in-migration areas, for example,

(Insert Table 5 here)

may have been connected with housing developments, industrial building, institutional expansion, or facilities for resource extraction. The environmental and social amenities of rural areas have also been cited as a reason for net in-migration turnaround. Officials who have observed turnaround to net out-migration in their localities explain the phenomenon in terms of the out-migration of youth (consistent with our finding about age structure), reduced agricultural work, plant relocation to other areas or layoffs, and the reduction of jobs on military bases. Housing developments were cited most often as the cause of net in-migration turnaround. The inability of localities to employ young people was the main reason cited for net out-migration turnaround.

Summary and Discussion

Nonmetropolitan population turnaround has been a recent demographic phenomenon which has affected about 17 percent of the localities in the region of this analysis. Whether this redistribution of people has foreshadowed subsequent movement of larger numbers of the population cannot be determined here. It was interesting to note that even though more places have turned to net in-migration than net out-migration, the magnitude of movement was estimated to be greater for places with out-migration turnaround. Hence, while more nonmetropolitan places have turned to in-migration, the place which turned to out-migration involved larger numbers of migrants.

On the average both types of migration turnaround has occurred about 20-25 miles from an urban center, nearly a half-hour drive from the city. This zone has received much attention as an ideal place to live, according to public opinion polls (Zuiches and Fuguitt, 1972). It has also been a common location for nonmetropolitan growth (Humphry and Sell, 1975). Since the turnaround has occurred in an area defined by the public as ideal for residence and in an area with much growth, spillover may be causing net in- and out-migration turnaround. As one minor civil division in a rural setting reaches some undefined maximum degree of development, subsequent migrants to the nonmetropolitan sector move to an adjoining or nearby subdivision where the density and population have remained small.

Nonetheless, reductions in the number of small farms, cut-backs on some military installations, industrial relocation, and the like have continued to reduce the size of some nonmetropolitan places. In the cases we have examined here, this has reversed growth trends to net out-migration. Population turnaround of this kind has been more likely in large, densely settled nonmetropolitan places with a surplus of people 15-24 years old. Whether these characteristics of places have been causes of the turnaround to net out-migration or simply correlates of this turnaround has not been sufficiently determined in this research.

Functionally, the net in-migration turnaround areas were unique because residents were employed in relatively specialized industries such as farming, nondurable goods manufacturing, and construction. Some of this economic activity such as home building, road construction, and industrial siting was the result, not the cause, of in-migration turnaround, though some of it may have also contributed to in-migration as well. We have not inferred that a resurgence in farming induced the in-migration, even though the in-migration turnaround areas were specialized in this industry. Instead, the investigators interpreted this observation as an economic endeavor highly correlated with small, sparsely settled minor civil divisions. We have surmised that many such nonmetropolitan places are subdividing as the demand for living space outside urban areas has taken hold.

The investigators have planned a continuation of this research in several ways. First, we want to develop a typology for turnaround which move adequately segregates different kinds of nonmetropolitan population growth. The turnaround areas may have to be classified by distance to the nearest metropolitan area as well as the direction of net migration turnaround. Then a comparison of characteristics for the two kinds of turnaround can be made between the distance zones. This may help in developing better ideas about kinds of turnaround. Second, we want to do some case analysis of places which have had different experiences with industrial relocation and other forms of employment. Some nonmetropolitan places have been loosing employment opportunities which retain and draw young people, while other places about the same distance from urban centers have been gaining these inducements to population growth. Detailed case histories can help develop more specific reasons for differences between the two kinds of nonmetropolitan population turnaround.

FOOTNOTES

1. Nonmetropolitan places in this research were boroughs and townships outside of urbanized areas in Pennsylvania as defined by the U.S. Census in 1950

2. The population below age 15 was excluded because the investigarors encountered different breakdowns for these young ages in the published census records during the 30 years period, 1940-1970.

3. The correlation between estimated net migration with our method and "the vital statistics method" for the 1960's equaled .93. It would have been higher if we could have calculated the number of net migrants under age 15.

4. Because of the information available in this data set, the measure of economic differentiation was based on information published in 1970. The investigators have assumed that there was considerable consistency in the economic bases of these places between 1960 and 1970.

5. Major urban areas outside Pennsylvania such as Binghamton, New York; Youngstown, Ohio; Baltimore, Maryland; Washington, D.C., and New York City were also considered when the population potential of each place was measured.

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TABLE 1

Estimated Net Migration Trends for the Population 15 Years Old and Older Residing in Minor Civil Divisions of a Nonmetropolitan Region, 1940-1970

	Net migration trend 1940-1970	Percentage distribution for nonmetropolitan places N=1815
(1)	Out-migration 1940-70	48.3%
(2)	Out-migration 1940-50, in-migration 1950-60, out-migration 1960-70	4.7
(3)	Out-migration 1940-60, in-migration 1960-70	13.2*
(4)	Out-migration 1940-50, in-migration 1950-70	7.4
(5)	In-migration 1940-50, out-migration 1950-70	6.8
(6)	In-migration 1940-60, out-migration 1960-70	4.5*
(7)	In-migration 1940-50, out-migration 1950-60, in-migration 1960-70	5.1
(8)	In-migration 1940-70	10.0
	TOTAL	100.0%

* Turnaround areas examined in this research.

TABLE 2

Measures of Central Tendency and Dispersion for a Nonmetropolitan Region and for Nonmetropolitan Minor Civil Divisions Where Net Migration Trends Reversed Since 1960 for the First Time in 30 Years

	All Places in Study Region		Out-migration 1940-60 and in-migration 1960-70		In-migration 1940-60 and out-migration 1960-70	
	Mean	Standard Deviation N=1815	Mean	Standard Deviation N=237	Mean	Standard Deviation N=82
Population of MCD						
1940	2190	4296	1175	1373	2572	5160
1950	2263	4428	1192	1472	3021	5830
1960	2492	4829	1237	1617	3969	7219
1970	2698	5092	1479	1862	4099	7610
Estimated Net Migration *						
1940-50	-112	665	-114	248	170	326
1950-60	-100	910	- 93	121	363	1388
1960-70	- 29	663	72	106	-183	274
Change in Institutional Population of College(s) or Military Base(s)						
1940-50	18	164	2	10	27	146
1950-60	10	175	2	16	35	180
1960-70	40	377	10	60	22	266
Distance to Controlled Access Highway Interchange (Miles)						
1940	65.1	37.3	69.7	39.0	62.0	37.5
1950	44.1	32.9	51.7	34.7	35.4	35.0
1960	22.2	18.2	23.9	19.4	19.0	20.0
1972	8.4	7.0	10.0	7.4	6.1	6.1
Distance to Nearest SMSA (Miles)	26.6	14.1	25.7	14.9	23.3	11.5
Population Per Square Mile 1960	679	1565	305	779	673	779

* Estimated Net Migration Refers to the Population Aged 15 Years and Older

TABLE 3

Variables Included in the Final Discriminant Function Analysis

Characteristics of nonmetropolitan minor civil divisions	Kind of Nonmetropolitan Turnaround: Out-migration 1940-60 and in-migration 1960-70 — Mean	Kind of Nonmetropolitan Turnaround: In-migration 1940-60 and out-migration 1960-70 — Mean	Univariate F-ratio*	Standardized Discriminant Coefficients	t-ratios for Coefficients**
(1) Total population of borough or township, 1960	1237	3969	29.4	.65	3.90
(2) % population 15-24 in 1950	14.7%	13.7%	8.2	.47	2.76
(3) Miles to highway interchange, 1950 - miles to interchange, 1940	-18.1 miles	-26.6 miles	9.7	.40	2.57
(4) Miles to highway interchange, 1960 - miles to interchange, 1950	-16.3 miles	-27.8 miles	12.6	.36	2.25
(5) % population 15-24 in 1960	12.8%	13.5%	3.0	.35	2.25
(6) Population/sq. mi., 1960	305	673	13.5	.32	2.11
(7) % population 15-24 in 1940	18.1%	17.3%	5.1	.31	1.89

* F-ratios $\geq$ 3.89 significant at .05 level

** t-ratios $\geq$ 1.96 significant at .05 level; $\geq$ 1.66 significant at .10 level

TABLE 4

Indicies of Functional Differentiation by Industry of Employment, 1970
for Nonmetropolitan Turnaround Communities

Functional specialization of minor civil divisions	Kind of Net Migration Turnaround: Out-migration 1940-60 and in migration 1960-70 — Mean	Standard Deviation N=237	In-migration 1940-60 and out-migration 1960-70 — Mean	Standard Deviation N=82	A.O.V. F-ratio*
Overall Amount of specialization	1.62	1.08	1.32	0.87	5.3
Agriculture	0.18	0.39	0.06	0.24	7.0
Mining	0.05	0.22	0.01	0.11	2.3
Construction	0.15	0.36	0.06	0.24	4.2
Durable goods	0.15	0.36	0.24	0.43	3.6
Nondurable goods	0.21	0.41	0.08	0.28	6.3
Transportation	0.11	0.32	0.06	0.24	1.9
Trade	0.11	0.31	0.16	0.37	1.4
Finance	0.11	0.32	0.15	0.36	0.6
Business	0.11	0.31	0.05	0.22	2.7
Services	0.14	0.34	0.07	0.26	2.2
Entertainment	0.05	0.22	0.02	0.16	1.0
Professions	0.21	0.41	0.13	0.33	3.2
Public administration	0.12	0.33	0.13	0.34	0.1

* F-ratio $\geq$ 3.84 significant of .05 level

TABLE 5

Most Frequently Cited Reasons for Net Migration Turnaround According to Officials of Nonmetropolitan Minor Civil Divisions*

Net In-Migration Turnaround (Number of Officals Responding = 129)		Net Out-Migration Turnaround (Number of Officals Responding = 43)	
Main Reasons Stated	%	Main Reasons Stated	%
1. New housing development	31.8	1. Young people moving away	39.5
2. Retired people moving in	27.1	2. Farms stopped operating	20.9
3. New industry moving in	26.4	3. Plants reduced jobs	18.6
4. Expansion of existing industry	18.6	4. Plants left area	16.3
5. Expansion of college or school	14.0	5. Military base reduced jobs	7.0
6. Rural amenities attract people	12.4		
7. Urban to rural migration	10.9		
8. Increased mining for coal, gas, oil	6.2		

* Items do not sum to 100% because multiple responses were permitted and some infrequent responses were not coded.